



## King's Research Portal

DOI:

[10.1080/14649365.2020.1777322](https://doi.org/10.1080/14649365.2020.1777322)

[10.1080/14649365.2020.1777322](https://doi.org/10.1080/14649365.2020.1777322)

*Document Version*

Publisher's PDF, also known as Version of record

[Link to publication record in King's Research Portal](#)

*Citation for published version (APA):*

Crang, P., Brickell, K., Parsons, L., Natarajan, N., Cristofolletti, T., & Graham, N. (2022). Discardscapes of fashion: commodity biography, patch geographies, and preconsumer garment waste in Cambodia. *Social & Cultural Geography*, 23(4), 539-558. <https://doi.org/10.1080/14649365.2020.1777322>, <https://doi.org/10.1080/14649365.2020.1777322>

### **Citing this paper**

Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

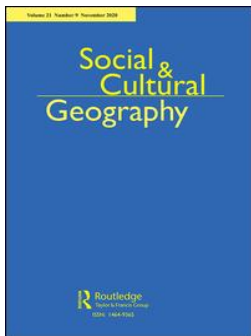
### **General rights**

Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Research Portal

### **Take down policy**

If you believe that this document breaches copyright please contact [librarypure@kcl.ac.uk](mailto:librarypure@kcl.ac.uk) providing details, and we will remove access to the work immediately and investigate your claim.



## Discardscapes of fashion: commodity biography, patch geographies, and preconsumer garment waste in Cambodia

Philip Crang , Katherine Brickell , Laurie Parsons , Nithya Natarajan , Thomas Cristofolletti & Naomi Graham

To cite this article: Philip Crang , Katherine Brickell , Laurie Parsons , Nithya Natarajan , Thomas Cristofolletti & Naomi Graham (2020): Discardscapes of fashion: commodity biography, patch geographies, and preconsumer garment waste in Cambodia, Social & Cultural Geography, DOI: [10.1080/14649365.2020.1777322](https://doi.org/10.1080/14649365.2020.1777322)

To link to this article: <https://doi.org/10.1080/14649365.2020.1777322>



© 2020 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



Published online: 04 Jun 2020.



Submit your article to this journal [↗](#)



Article views: 1580



View related articles [↗](#)



View Crossmark data [↗](#)



OPEN ACCESS



# Discardscapes of fashion: commodity biography, patch geographies, and preconsumer garment waste in Cambodia

Philip Crang<sup>a</sup>, Katherine Brickell<sup>a</sup>, Laurie Parsons<sup>a</sup>, Nithya Natarajan<sup>b</sup>,  
Thomas Cristofolletti<sup>c</sup> and Naomi Graham<sup>d</sup>

<sup>a</sup>Department of Geography, Royal Holloway University of London, Egham, UK; <sup>b</sup>Department of International Development, King's College London, London, UK; <sup>c</sup>Ruom Collective, Phnom Penh, Cambodia; <sup>d</sup>Independent Scholar

## ABSTRACT

This paper advances existing research on both the geographies of fashion and the geographies of waste, utilising their shared interests in commodity biography. Empirically, it documents the use of textile waste from export-oriented garment factories in the peri-urban areas of Phnom Penh, Cambodia as fuel for nearby brick-kilns supplying the city's booming construction sector. Interviews and documentary photography present the forms of living, labour and harm at both the brick-kilns and the garment dump from which the textile waste is sourced. Substantively, the paper argues for the consideration of preconsumer garment waste to complement the dominant preoccupation with postconsumer waste and reuse. Conceptually, the paper argues for geographical biographies of commodity culture that are attentive to things' material dynamics of becoming, unbecoming and transformation across spaces, sectors and material forms: that is, to their 'patch geographies'.

## Paisajes del descarte en la moda: biografía de las materias primas, geografías de los parches y desperdicio de ropa pre-consumo en Camboya

## RESUMEN

Este artículo contribuye con la investigación existente sobre las geografías de la moda y las geografías de los residuos, utilizando sus intereses compartidos en la biografía de las materias primas. Empíricamente, documenta el uso de desechos textiles de fábricas de ropa orientadas a la exportación en las áreas periurbanas de Phnom Penh, Camboya, como combustible para los hornos de ladrillos cercanos que abastecen al sector de la construcción en auge de la ciudad. Las entrevistas y la fotografía documental presentan las formas de vida, trabajo y daños tanto en los hornos de ladrillos como en el basurero de donde provienen los desechos textiles. Sustancialmente, el artículo aboga por la consideración del desperdicio de ropa antes de su consumo para complementar la preocupación dominante con el desperdicio y reutilización post-

## ARTICLE HISTORY

Received 5 December 2019  
Accepted 27 April 2020

## KEYWORDS

Fashion; waste; discard;  
Cambodia; commodity  
biography

## Palabras clave

moda; desperdicio; descarte;  
Camboya; biografía de  
productos básicos

## Mots-clefs

Mode; gaspillage; débaras;  
Cambodge; biographie  
mercantile

**CONTACT** Katherine Brickell ✉ [katherine.brickell@rhul.ac.uk](mailto:katherine.brickell@rhul.ac.uk) 📍 Department of Geography, Royal Holloway University of London, Egham, UK

© 2020 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group  
This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

consumo. Conceptualmente, el artículo aboga por biografías geográficas de la cultura de las materias primas que estén atentas a las dinámicas materiales de convertirse, descomponerse y la transformación a través de los espacios, sectores y formas materiales: es decir, a sus 'geografías parchadas' (Tsing, 2015).

## **Des panoramas de gâchis au nom de la mode: biographie mercantile, géographie du parcellement et gaspillage de vêtements à l'amont du consommateur au Cambodge**

### **RÉSUMÉ**

Cette communication joint les courants de recherche existant à la fois dans la géographie de la mode et celle du gaspillage, en utilisant leurs intérêts communs dans la biographie mercantile. Du point de vue empirique, elle documente la manière dont les restes de textiles venant des usines de vêtements pour l'exportation qu'on trouve dans les zones périurbaines de Phnom Penh, au Cambodge, sont utilisés comme combustible pour les usines de briques avoisinantes qui approvisionnent le secteur florissant de la construction de la ville. Des entretiens et des photos-documentaires présentent les formes de vie, de travail et de dangers dans les usines de brique et dans la décharge de vêtements d'où viennent les déchets textiles. Du point de vue substantiel, la communication soutient qu'on devrait prendre en compte ce gaspillage textile à l'amont du consommateur en complément de la préoccupation dominante concernant le gaspillage textile et la réutilisation à l'aval du consommateur. Du point de vue conceptuel, elle se prononce en faveur d'une culture géographique de la biographie mercantile qui se concentrerait sur les dynamiques matérielles des choses qui concernent le devenir, le non-devenir et la transformation à travers les espaces, secteurs et formes matérielles: c'est à dire, à leur « géographie du parcellement » (Tsing, 2015).

## **Introduction**

Not far from Phnom Penh, a mother walks along balancing her youngest son against her hip, whilst her eldest clutches her hand (Figure 1). Their walk, taken multiple times a day, is past a brick kiln fuelled by the multi-coloured garment waste that can be seen spilling out of plastic bags. As part of a debt-bonded migrant workforce, the family work and live on site, their corrugated tin home located just metres from where the garment waste is being burned. The kiln is part of Cambodia's lucrative domestic brick-making industry, feeding and fed by Phnom Penh's construction boom. Rather than relying on wood for its fuel the kiln owners use off-cuts from the country's garment factories, sourced partly from a dedicated dump. Those garment factories comprise Cambodia's principal export-focused manufacturing sector, supplying particularly European, fast-fashion retailers.

This paper reflects on those conjunctures of fashion, waste, life and labour. Our argument brings together work on the 'geographies of fashion' (Crewe, 2017) with studies of what Lepawsky (2018, p. 141) calls the 'discardscapes' of waste. In



**Figure 1.** A mother and her children walk past a burning brick kiln fuelled by garment off-cuts (Photo by Thomas Cristofolletti; copyright Royal Holloway University of London [RHUL]).

particular, it focuses on their shared connections to, and implications for, understandings of the geographical biographies of commodities. Substantively, the paper argues that current understanding of fashion waste is limited by its predominant focus on postconsumer geographies of clothing discard in the global north and advocates for greater attention to preconsumer garment waste in the global south: the multiple industries which collect, materially transform, and profit from it; and the lives of precarious workers who are incorporated into, and are formative of, these discardscapes of fashion. Conceptually, the paper advances an argument for geographical biographies of commodity culture that are attentive to things' material dynamics of becoming, unbecoming and transformation across spaces, sectors and more-than-human material forms. It suggests that linear metaphors such as commodity chains can occlude the more complex 'patch geographies' (Tsing, 2015, p. 225) of discardscapes and their material biographies. And it argues for a political engagement with these patchy geographies that not only calls upon a revelatory unveiling of hidden spaces but also an active, 'æffective' engagement with the aesthetic economies of fashion worlds.

Based on extensive mixed-method interview data, investigative research, documentary photography and particulate air readings undertaken in Cambodia between 2017 and 2019, we build this argument over five sections. First, we put forward our propositions for 'fashioning discardscapes', contextualising the paper in relation to existing work on commodity biographies, the geographies of fashion, waste and 'discardscapes', and the forms of labour and life undertaken in sites of waste. Second, we outline the methodology followed in the Cambodian research, including a discussion of the critical realist documentary photography that features as a visual component of this paper. The third and fourth sections centre on the spaces of the brick kiln and then the garment dump from which the kilns' clothing waste-fuel is part sourced. The fifth and final section concludes by setting out the interrelations between the patchy form of fashion's discardscapes and the politics of their representation.

## Fashioning discardscapes

This paper's fashioning of discardscapes is underpinned by four propositions. First, we are concerned with advancing a commodity biography approach, which in the area of social and cultural geography is particularly associated with calls to 'follow the thing' (I. Cook et al., 2004, 2017). Our position is that this body of work should be conceived as holding in productive tension several different emphases on material geographies: revealing, complicating and 'æffecting'. Perhaps the most recognised of these emphases is the *revelation* of geographies of material production and circulation that are generally hidden (Hartwick, 1998). Here, then, the following of things is an investigatory practice that promises a better understanding of the origins of the stuff we consume, a lifting of the 'veils' of commodity fetishism. Linear metaphors of commodity spatiality, such as commodity 'chains', are deployed to underscore relations of connection and responsibility between consumers and producers; and the work of revelation is cast as promoting a more critical relationship to the material cultures of an intensely commodified world. However, commodity biographies have other impulses too. Crucially, many strands of such work are less preoccupied with revelation than with *complication*. Biographies from the perspective of material culture studies construct multi-dimensional geographies as they tease out inter-related movements and settlements of objects, materials, knowledge, information, ideas, money, and people (Cook & Crang, 1996). In tracing out transformations in things' meanings and materialities over time and space they uncouple the very notion of a thing from the idea of a single object (Crang & Ashmore, 2009). Non-linear metaphors of circuits, networks, exchanges, and translations tend to predominate in such complicating biographies (Lash & Lury, 2007; Lepawsky & Mather, 2011; Tsing, 2015). Cutting across the projects of revelation and complication is a third concern, the 'æffective', to use Duncombe's neologism (Duncombe, 2016). Developed in relation to the field of socially engaged art, the term 'æffect' centres the political effects provoked by the affective power of creative expression. In an 'æffective' mould commodity biography is cast into creative interventions in commodity cultures, most commonly pursued through an association between 'follow the thing' research and 'commodity art-activism' (see, for example, I. Cook et al., 2000, 2018). Our broader argument, however, is that an æffective emphasis rightly recognises commodity biography as an engagement with, rather than dismissal of, the aesthetic dimensions of commodity culture.

Our first proposition for this paper, then, is the need to advance geographical work on commodity biographies through combining impulses to reveal, complicate and æffect.

Second, we pursue this approach in relation to the geographies of fashion. Tellingly, in her recent monograph on the field, Crewe proposes that the geographies of fashion are too often framed in terms of 'discrete spaces' (Crewe, 2017, p. 40): on the one hand, spaces of aesthetic allure and glamour, idealising clothing consumption in carefully engineered environments of display; on the other hand, fashion's 'dark geographic underbelly' (Crewe, 2017, p. 8) of often globally extensive production networks characterised by social, economic and environmental inequalities and abuses. This binary 'spatial construction' accords with a logic of commodity fetishism constituted through 'forms of geographical association and dissociation ... that ... has enabled the fashion industry to bring certain spaces and places into high relief while masking the global inequalities, abuses of labour standards, ecological damage, and environmental catastrophes that underpin the

industry' (Crewe, 2017, p. 59). Contesting this spatial imaginary, Crewe argues instead for a focus on 'the complexities of the geographical biographies of [fashion's] commodities' so that fashion can be 'understood in terms of relationality – as a recursive loop that is characterized by complexity and connection' (Crewe, 2017, pp. 7, p. 1). In this, her work chimes with the endeavours of numerous activist and campaign organisations (e.g., *Labour Behind the Label* and *Fashion Revolution*) as well as a range of fashion theorists concerned with, *inter alia*, labour conditions for garment workers (Ross, 1997), ethical fashion (Haug & Busch, 2016; Joy et al., 2012) and sustainable and eco-fashion (Payne, 2019).

Fashion waste has an increasingly prominent role in these debates. At the most general level, fast fashion's temporalities of acquisition and ridding seem to represent the inherent association between a 'liquid modern, consumerist culture of individualization' and novelty with dynamics of 'excess, redundancy, waste and waste disposal' (Bauman, 2004, pp. 7, p. 97). More concretely, the global production of over 100 billion garments a year, tied to consumption cultures marked by decreasing garment life spans before ridding, has led to pressing concerns with waste and disposal (Cooper, 2018). In the United Kingdom roughly two million tonnes of clothing and textiles are thrown away each year and only 16% of that waste is reused (Gould, 2015). There are 'increasing calls for it [the fashion industry] to take responsibility for the waste it generates throughout the production process and supply chain through to end of use' (Norris, 2019, p. 887). Ideas of the 'circular economy' are prominently featured within the fashion garment industry and its discussions of ethical and sustainable practice (Ellen MacArthur Foundation, 2017; Mistra Future Fashion, 2019). These promote a shift from a "linear 'take-make-waste' model to a circular Good Fashion approach that is restorative and regenerative by design" (Fashion for Good, n.d.). Academic and practical attention has focused on a range of issues associated with the on-going lives of garments after their purchase and use, including: waste management (Binotto & Payne, 2017; Payne, 2012); the politics of global systems of clothing and textile recycling, that see waste exported from global north to global south (Brooks, 2013, 2015; Crang et al., 2013); postconsumer reuse (Isenhour & Reno, 2019) in second-hand economies of clothing (Gregson & Crewe, 2003; Shaw, 2019); and the recycling of post-consumer textile fibre waste back into desirable fashion, upcycling, and DIY (Norris, 2019).

Our second underpinning proposition, therefore, is the need to advance geographies of fashion through engagement with commodity biographies; and the recognition of fashion waste as a particularly pressing issue in this regard.

This leads to our third rationale for the paper: developing the engagement between research on fashion geographies and research on the spatialities of waste. Lepawsky's concept of 'discardscapes', developed in his extensive research on electronic or e-waste, provides a notable inspiration here. Conceptually, the notion of the discardscape is designed to emphasise 'waste as ... a fundamentally constitutive element of industrial ways of life' (Lepawsky, 2018, p. 132) rather than as an exceptional externality. It resists binaries of waste and value, rubbish and commodity, not least through heightened attention to practices of re-use, re-purposing and recycling. This re-thinking challenges conventional accounts of the processes, spaces and governance of value creation. It also reinforces the need to reflect carefully on how we conceive of the biographies of commodities and the following of things. In a context where one thing can become another (or, indeed, many others) it is not a simple matter to conceive of where one



thing's life ends and another's starts (Lepawsky & Mather, 2011). For example, Lepawsky and Billah (2011) explore how e-waste in Bangladesh is repurposed not only in new electronic products but in the production of toys, jewellery and household utensils. Things are re-made in inter-sectoral networks. Likewise, in this paper we focus on garment waste being used in brick-making. As textile becomes fuel which transforms clays into bricks, connections between seemingly distinct sectors of Cambodia's economy are foregrounded: the export-oriented garment factories are interwoven with the nationally/Phnom Penh focused brick and construction industries.

Crucially, Lepawsky (2018) also links the idea of discardscapes to a broadening of focus beyond the actions surrounding post-consumption ridding and waste. He contests an unbalanced preoccupation with the export of post-consumption waste in the global north to waste and recycling sites in the global south and argues for more attention to be paid to flows of waste within the global south. Similarly, this paper focuses on the waste created during garment production, including the 'selvages' or edges of industrially loomed fabrics, left over materials from the cutting process, and other fabric scraps. It is believed that 15% of fabric intended for clothing in the global apparel industry ends up on the cutting room floor (EDGE, 2019), and that of the 400 billion m<sup>2</sup> of textiles made annually 60 billion m<sup>2</sup> becomes manufacturing waste (Fashion Revolution, 2015). However, it is also recognised that the low or non-existent level of visibility across supply chains makes it difficult to evidence accurately how much preconsumer waste is really created and exactly how it is managed (Fashion Revolution, 2015). Global fashion brands are not transparent about their amounts of preconsumer textile waste and in many cases investigative reporters have tried but struggled to find out what really happens with preconsumer waste.

Our third proposition, then, is for geographers and other disciplinary scholars to attend to the less visible and less documented geographies of preconsumer waste that are an important part of fashion's discardscape.

Finally, this emphasis on fashion's preconsumer waste precedes a fourth motivation of our paper, to explore the forms of labour and life bound up with its discardscape. The geography of fashion we present here involves not only the labour undertaken on the garment factory floor but also labour in the much less studied spaces of garment waste-work located in factory vicinities. Whilst Cambodian garment factory workers' lives have been the subject of careful study (Lawreniuk, 2019), up until now no attention has been paid to the labour involved in the discard of clothing manufacture waste in Cambodia. As Millington and Lawhon (2019) note, a feature of research on waste in the global south has been critical attention to the 'informal' labour associated with waste management and sites such as garbage dumps (Chalfin, 2019; Fredericks, 2018; Gidwani, 2015; Millar, 2014, 2018; O'Hare, 2020; Rosaldo, 2019). For Chalfin (2019, p. 500), waste sites perform 'a dialectics of precarity' where the material instabilities caused by global over-production of stuff engage with the human instabilities of the 'insecure urban precariat'. For some, this juxtaposition symbolises the connection between the systems that produce material waste and the modern production of 'wasted lives', 'human beings bereaved of their heretofore adequate ways and means of survival in the biological and social/cultural sense of that notion' (Bauman, 2004, p. 7). However, in the often richly ethnographic research undertaken by scholars in this area, more nuance is provided. For example, in her writing on the 'catadores' (pickers) working the dump at Jardim Gramacho, Rio de Janeiro,



Millar (2018) is at pains to counter understandings of both waste and waste workers as somehow formless, as only a disordered excess, thought only as the negation of productive objects or people. Instead, she teases out the catadores' 'forms of living' – their livelihoods and ways of life – and shows that these depend on their capacity to create orders from what might be seen by outsiders as only waste (most obviously, through having the discriminatory skills to pick over garbage and establish different sorts of re-use and value within it).

So, whilst we too see value in casting 'the lived conditions of ... waste work as a window on contemporary capitalism' (Chalfin, 2019, p. 501) we agree with Millar (2018) that this needs to be done in ways that resist totalising narratives that bluntly equate non-human and human waste. Generally, this means engaging with those working and living with waste as human subjects, with voices, biographies, lives. Specifically, in this paper we approach the task through combined attention to how both kiln and dump stage 'forms of living' and 'forms of harm'. This dual focus is not intended to contest Millar's (2018) emphasis on the socio-cultural orderings of those who work with waste. Brick kiln and dump workers certainly exert agency in and through these environments. However, it does reflect how our empirical findings differ from Millar's, in presenting orderings of labour and life with far less autonomy, and more sustained material threat, than she encountered. In consequence, based on the testimonies given to us, we present the kiln and garment dump as not only lively but also harmful spaces.

Our fourth and final proposition for the fashioning of discardscapes is thus to engage with the labours and lives undertaken within them; and to probe the nexus of material decomposition (dumping and burning), re-composition (into fuel, collectables and bricks) and human harm.

## Researching discardscapes of fashion in Cambodia

The research presented in this paper was undertaken in Cambodia between 2017 and 2019 as part of a larger project focused on the translocal geographies of the Cambodian brick industry. Moving from the city, to the brick kiln, and finally back to the rural villages once called home, the research explored how urban 'development' in Cambodia is built on unsustainable levels of debt taken on by rural families struggling to farm in one of the most climate vulnerable countries in the world (Brickell et al., 2018). Specifically, in trying to repay often multiple microfinance and informal loans taken on to cope with the destructive impacts of climate change on agrarian production, smallholder farmers from rural villages across Cambodia are being compelled to leave their homes to live and work in brick kilns. Research within three brick-sending villages revealed the deep penetration of microfinance (MFI) loans, in particular, and the problems with repayment in terms of the structures of the loans and the strained situation of rural households. These loans had become a key means to meet household consumption needs, as well as to buy farm inputs and to invest in irrigation to guard against the capricious climate. The acute challenges of repaying MFI loans place an onus upon indebted households to seek out alternative work, including in the brick industry. Across Cambodia there are 10,217 people working in brick kilns, of whom 4777 are female, 5440 male, and 3937 children aged under 18 (Parsons & Ly Vouch, 2020). Typically, indebted villagers ask a brick kiln owner who has already employed people from the same village for an advance to pay off their MFI loan,

and with this it is common for whole families to move to the kiln site to work off the consolidated debt bond through the piece-rate brick work (Natarajan, Parsons et al., 2019). Debt-bonded brick workers therefore face severe circumstances but also exert some degree of choice in their decision to bond themselves to kiln work.

The research in those brick kilns revealed the use of garment waste considered in this paper. In consequence, the research traced out the sources for this waste fuel and explored in more depth the connections between the brick and fashion industries through garment manufacture discard. In presenting its findings, the article draws on mixed-method data. Qualitative interviews were undertaken in Cambodian brick kilns with over 100 workers, factory owners, union leaders, former kiln workers, residents around the kilns, and Buddhist monks. We also undertook air quality monitoring in kilns burning garment waste: a handheld portable particulate monitor was used for measurement of PM10 and PM2.5.<sup>1</sup> On visits to the kiln sites, fieldnotes documented the brand labels found there. The team undertook investigative work to locate the garment waste dump, including speaking with informants such as truck drivers at the garment factory bins and those making deliveries of garment waste to the kiln sites. The researchers went on to visit the garment waste dump on multiple occasions in 2018 to speak informally with informants, and in 2019 the team undertook more formal interviews on site with eight garment waste pickers. Pseudonyms are used in reporting on our interviews with waste pickers and kiln workers. We also held interviews with Fashion Revolution in Cambodia and an ethical fashion brand which uses scrap waste sourced from mass clothing manufacturers for its products produced in the country.

From late 2017 and across 2018 the project's documentary photographer, Thomas Cristofolletti, was introduced to the brick kilns, and then independently re-visited them, to capture, with verbal consent, the lived experiences of people working and living there. He would typically stay on the kilns from the early morning into the night after darkness. The academic researchers and Thomas agreed that for safety and ethical reasons connected with the illegality of debt bondage the photographs should not capture the faces of workers and their family members. After the research team identified the location of the garment dump, Thomas then photographed the site and workers labouring there using both a hand-held and drone-operated camera. Along with detailed captions, he provided the academic researchers with 247 photographs from the brick kilns and 22 from the garment waste dump.

The relationship between 'the problem of knowing waste' (Lepawsky, 2018, p. 13) and photographic practice and circulation is both rich and complex (Crang, 2010; Gidwani, 2013; Lepawsky, 2018). The photographs we present operate in the spirit of the 'critical realism' most famously associated with the practice of Allan Sekula. For Szeman and Whiteman (2012, p. 48), Sekula's photography develops the 'almost unprecedented capacity [of the photographic image] to provoke conceptual, theoretical and political openings as a result of its relation to the real' whilst resisting naive realism, because 'Sekula's version of realism is not one that relies uncritically on the relation of the photographic image to some easily accessible real that can be comprehended outside of the discursive and narrative frames that constitute the social.' As Sekula himself puts it: 'This realism sought to brush traditional realism against the grain. Against the photo-essayistic promise of "life" caught by the camera, I sought to work within a world already replete with signs' (Sekula, 1984, p. x). Thus, in this paper, whilst on the one hand we

deploy the power of photography to document, and to reveal sites and experiences that might otherwise be hidden, on the other hand the photos also deliberately engage broader visual, discursive and socio-economic circuitries. In the context of fashion's geographies, this means operating in relation both to the industry's aesthetic labours – for example, those devoted to brand identity through various forms of spatial association and dissociation – and the visual work of multiple NGOs and critical commentators. The photography consciously works in that semantic space, as well as with broader traditions from photographic and art history. Whilst sometimes referenced in illustrative terms, the seven chosen images are presented primarily as æffective interventions, intended to exceed interpretive capture in the written text. Nonetheless, two readily apparent aspects of their visual form deserve mention here. First, the decision to avoid photographing people's faces has a notable impact: in some ways, perhaps, de-personalising those photographed; and yet, in so doing, presenting figures whose very humanity comes to the fore (even if in some images it is a feeling of threat to that human status that is conveyed). Second, the visual power of the images as aesthetic objects should be apparent from their reproduction here, indicating the wider work they have performed in engaging audience attention to the kiln and dump as patches in fashion's discards-capes, a theme to which we return in the paper's conclusion.<sup>2</sup>

### Garment burning in Cambodia's brick kilns

The use of garment waste to fuel brick kilns in Cambodia is not ubiquitous, yet it is notable. A national-level survey of all brick kilns recorded that 23 kilns out of 465 (4.9% of all kilns) use garments as fuel (Parsons & Ly Vouch, 2020). However, the practice is predominant in areas close to garment manufacturing sites; indeed, in peri-urban Phnom Penh, near the garment factories, a visible indicator of there being a brick kiln in the vicinity is a column of thick black smoke towering into the sky above (Figure 2). Cambodia's economic growth has been founded upon huge expansion in the construction, garment and service sectors, each characterised by a distinctive geography. Phnom Penh's burgeoning garment industry is a key export-focused driver of national growth,



**Figure 2.** Black smoke emitted from a garment-fuelled brick kiln in Cambodia (Photo by Thomas Cristofolletti; copyright RHUL).

accounting for 75% of all manufacturing output in 2010, up from 15% in 1995 (Asian Development Bank, 2014, p. 25). Cambodia's biggest export market is the EU, with 45% of its garments exported there (International Labor Organisation, 2016). The brick industry has a domestic geographic orientation, enabling the 'lurching upwards' of Phnom Penh (Nam, 2017, p. 624) and its construction boom focused on both luxury, gated developments for local and overseas elites and low cost housing for migrants, many working in the garment sector (Paling, 2012). The fact that garments are burnt predominantly by brick kilns in the Phnom Penh area reflects that this is where the majority of garment factories are located, and hence where garment waste is accessible through the work of waste management intermediaries. In other words, through locally embedded geographies of waste and re-use Cambodia's globally oriented garment industry and domestically oriented construction sectors intermesh. Textile offcuts are readily available and are a cheaper and less environmentally regulated alternative to using forest wood as kiln fuel. As Piseth, a male brick worker, explained, the rationale for factory owners to use garment waste related to profit-margin:

'Previously, we used firewood, but we've turned to use garment fragments since the growth of garment factories ... they [the scraps] are driven here to us. They are cheaper than wood. Fuelling with wood doesn't make any profit.'

Hundreds of brand labels could be found amongst the scrap fabric. Those the academic researchers and photographer identified included British (Marks and Spencer; George at Asda), Spanish (Pull&Bear) and US-run companies (J Crew; Walmart; Old Navy). Thomas took this photograph (Figure 3) in the midst of watching a commonplace sight, children playing by jumping off the large bags of garment waste onto the ground beneath. At its centre is a Marks and Spencer (M&S) label. M&S is a well-known British high-street chain which espouses its commitment to sustainability through its Plan A, an 'eco and ethical programme that tackles both today's and tomorrow's sustainable retail challenges'.<sup>3</sup> It is a signatory of WRAP SCAP 2020 and has thus pledged consistently to measure and report global carbon, water and waste impacts.<sup>4</sup> Returning to the kiln site for the final visit in February 2019, the academic researchers found different



**Figure 3.** A child stands on top of fashion garment waste (Photo by Thomas Cristofolletti; copyright RHUL).

labels this time, but interviewed a family who were hanging out their clothes to dry with M&S hangers. The presence of M&S materials at the kiln is not intentional from the brand's point of view, indeed it is cast as something outside of their orbit. There has been no response to us directly from the company since the presence of their waste in the kilns was brought to their attention before our final visits in 2019, despite repeated emails and follow-up efforts to engage with specific human rights managers at the brand. Such silence can be read as a determination to externalise this discardscape from the brand's geographies. Thomas' photograph (Figure 3) resists this externalisation, deploying brand labelling to make an unwanted socio-spatial association.<sup>5</sup>

With no let-up in the use of garment waste across 2018 and into 2019, workers consistently felt that the switch from wood to garment waste had adverse impacts. The garment burning, often for several weeks at a time, had a profound influence on residents' health. Brick workers and their families have no protection. Even men who stoke the fire typically do so without a mask, and others try and make do with only cloth over their mouth and eyes (Figure 4). The 2018 'State of Global Air' report found that in India, which has a 'brick belt' across the central regions of the country, smoke emerging from kilns is the sixth-highest cause of respiratory-related deaths in the country (Health Effects Institute, 2018). No similar analysis exists vis-à-vis the Cambodian brick industry, however palpable health impacts upon kiln workers were reported in interviews. Clothing commonly contains toxic chemicals including chlorine bleach, formaldehyde, and ammonia. Heavy metals, PVC, and resins are also commonly involved in dyeing and printing processes. The academic researchers inspected and photographed many of the labels on the brick kiln sites. Typically, the clothing was a mix of cotton with elastane and/or polyester. Human-made materials, such as polyester, make up the vast majority of clothing made and discarded globally (Food and Agriculture Organization of the United Nations & International Cotton Advisory Committee, 2013) and have a 'malignant' capacity for lingering presence 'across numerous material and temporal scales' (Stanes & Gibson, 2017, p. 27). In Cambodian brick kilns, something of that malignancy is evoked as their burning produces black acrid smoke (Figure 2) and an oily residue from the kiln (Figure 5).



**Figure 4.** A brick worker stokes the kiln fire with garment waste (Photo by Thomas Cristofolletti; copyright RHUL).





**Figure 5.** A viscous residue oozes out of a brick kiln burning garment waste (Photo by Thomas Cristofolletti; copyright RHUL).

The commonplace noting of respiratory issues in our research speaks to the degradation of peoples' lungs in the brick-making sector. The particulate analysis we did when the garments were being burned showed consistent readings for PM<sub>2.5</sub> and PM<sub>10</sub> of 999.9 micrograms per cubic meter of air (ug/m<sup>3</sup>), the maximum readings possible on our sensors, and at a level classed as hazardous. PM<sub>2.5</sub> poses considerable health risks as fine particles can get deep into human lungs and even the bloodstream, with exposure affecting both respiratory and circulatory systems (the United States Environmental Protection Agency (EPA), 2019). Coarse particles (PM<sub>10</sub>) are known to irritate a person's eyes, nose, and throat. Here we encounter waste as a 'force in its own right as its unruly residues and brittle forms leave their mark on limbs, lungs and landscapes' (Chalfin, 2019, p. 515). Bopha, who lives on a kiln site, elaborated:

'There is really some impact, Teacher. As usual, we would use firewood to burn bricks, but the boss makes us burn garment waste instead . . . . People here were jobless and poor (at home) so they came to work here. Burning fabric causes more fumes and impacts on local people, mainly those working here. We don't know what to do about this as it's the boss' decision. As a result of the burning Teacher, some children have coughs whereas others have lung inflammation, respiratory infections, fever, or flu.'

A sense of helplessness pervaded Bopha's interview as she explained the lack of agency the workers had over fuel type. Her interview also brought home how their 'choice' to work in the kiln had been conditioned by a lack of alternative livelihoods given joblessness and poverty in the villages from which the workers originated. Other workers expressed fear, and suggested that they dared not complain about the garment burning given their reliance on, and debt to, the brick kiln owner. This anxiety, and sense of debt, was complex. Manifest in many cases were feelings of loyalty towards the kiln owner who, notwithstanding the highly exploitative labour practices demanded in return, had provided workers with a rare avenue and a sense of agency in dealing with their original financial debt(s). Nonetheless, workers were distressed, and were said to be miserable, about the 'black air flying around', sucked into their noses, and which meant they needed to brush their beds before going to sleep. According to several workers who had tried to raise the problem with the brick kiln owner, they had failed to listen or act, despite

knowing of these negative effects. As one worker told us, 'He makes profit, he doesn't care about our health, owners think burning garments are easy and profitable'.

## The garment dump

Garment waste is sourced by kiln-owners via intermediary systems of waste management. Our research found that preconsumer waste from garment factories is transported primarily to a vast privately-owned dump site (Figure 6) on the 50 trucks of an independent sub-contractor who exclusively sources and collects scraps from the garment factories located in Phnom Penh's industrial complexes. These complexes sell the offcuts at different rates dependent on the size of the fabric. The smallest pieces are those of most relevance to the brick industry and exist because of incorrect or oversupply of cloth and last-minute changes in production schedules. They are connected to the ever-increasing drive for brands to be immediately responsive and adaptive to fashion trends. At the dump itself there are estimated to be 100 self-employed workers who sort through the loads delivered by the trucks. Several of the workers we met pay 5,000–10,000 Riel (£1-1.95) per week to secure exclusive rights to the deliveries which arrive and these are left by their huts in return. The dump manager explained that it was banned to take garment scraps off site, and workers themselves claimed this practice unusual. In spite of this, others talked about the scraps being collected and sold on beyond the site in the middle of the night. Some of the waste collectors also admitted to collecting garment offcuts but explained that it was necessary to bribe the security guards to be allowed to remove them (unless the collector had a relative working for the company, in which case payment could be avoided). These are the offcuts that are then sold on to brick factories who prize low cost combustible material in spite of the environmental and health effects documented earlier. Pickers claim that the garment waste can be sold for 10-20 USD per truck to buyers in the local area, or 20-30 USD for buyers further away. We also found evidence that truck drivers stop before reaching the dump itself in order to sell parts of



**Figure 6.** Aerial photograph of the garment dump and trucks (Photo by Thomas Cristofolletti; copyright RHUL).



the waste material from the garment industry to smaller depots in the same area. The drivers were aware that selling the waste is against brand policies, so this practice remains secretive.

Whilst the dump had limited offerings, it afforded materials that allowed workers to create economic value, though at a problematically low level. The majority of pickers interviewed were in their forties and fifties, and several had daughters working in the nearby garment factories. They had come to work on the dump after accruing MFI debts (on MFI debt in Cambodia see Bylander, 2015; Green, 2019). As at the brick kilns, then, work here is linked to debt, though crucially with greater freedoms than debt bondage allows. Dump workers are independent, are free to come and go as they choose, and tend not borrow money from the dump owner, producing very different forms of labour and living to the brick kiln. Achaya, for example, had been working on the dump for three years when we met her. She had over-extended her borrowing taking out 1000 USD to build a house and had been unable to repay the loan through farming. This was compounded by wider family debt, including loans taken out by her sister for a motorbike. She made enough from picking to pay off the debts each month but had little else to spend. Achaya reported that the rainy season made picking difficult and the income she could derive was inconsistent as a result. She also complained that she regularly needs to go to hospital because of bacterial infections she contracted on the pathogen-heavy dump. While the dump was used almost exclusively for garment waste, areas of organic material were scattered around, which the foreman explained came from beer factories. Animals also roamed freely around the site (Figure 7). As a result of her illnesses, Achaya was outlaying money she did not have for healthcare. She noted, 'I want to change [from working on the dump] but what else can I do? I have no occupation. I have little power. I am always sick and I can only collect a little because of heart disease'.

For many workers, working on the dump reflected how farming had become unsustainable too, with rice yields plummeting. Fifty-seven year old Srei Mom had borrowed significant amounts of money from a microfinance lender to try and cope with the adverse impacts of climate change including droughts and floods. To do this she had 'pawned' her house title and rice fields. Unable to repay the debt, her family had become



**Figure 7.** Woman carrying garment waste on the dump (Photo by Thomas Cristofolletti; copyright RHUL).

landless and had turned to renting farmland, incurring ever greater debt in order to pay for fertilizer to overcome the worsening agricultural conditions. While her husband and children stayed trying to farm, she had felt compelled to move in order to support her household financially. She had been working on site for three months after encouragement from her sister-in-law. After paying 15 USD/month for a rental room in the vicinity, she is able to send back 200,000 Riels (£38) to her family. In order to do this she works long hours and complained of feeling 'a little bit dizzy because of fever' on a regular basis. Without funds to pay for seeing a doctor or prescribed medicines, she relied on herbal remedies and traditional scraping of the skin (*kors kha-yal*).

Fainting was described as a regular occurrence by the dump's workers, with the heat and lack of food taking its toll. Lida, who had worked on site for five months, described how 'some days are very hot and I almost faint'. Spontaneous fires were also a problem, arising due to the extreme heat beating down on the garments and the emission of gases. In the rainy season that had just passed she had also got stuck in the dump, her legs sinking into the waste. The amount she managed to earn through picking was not enough to support the healthcare her child required, who she feared 'will die before me'. Lida had recently divorced from her husband and because she didn't 'know where else to go' had come with her small child to work on the dump. Much like for brick kiln workers, then, Lida's decision to work on the dump had been guided by the lack of alternative options. Despite the precarious nature of the work and the income it generated, and the harmful material conditions of the dump, picking over the waste provided a means of just about surviving.

## Conclusion

For Piseth and Bopha living and working in garment-fuelled brick kilns, and for Achaya, Srei Mom and Lida picking garment off-cuts from the dump, the forms of living and forms of harm they experience hold an intimate connection to wider commodity biographies. This paper has focused specifically on tracking their connection to the Cambodian garment industry's production of textile waste. By way of conclusion, we return to our arguments on the broader significance of both the form and purpose of this tracking of a discardscape of fashion.

First, we have suggested that widespread academic and policy concern with postconsumer garment disposal needs to be matched by research on preconsumer waste, which up until now has been unduly neglected. A corrective emphasis on preconsumer waste also reorients attention to networks of waste management within the global south, linked to areas of mass garment production for consumers in the global north. As it stands the governance of such networks is weak, in part because the geographies of preconsumer discardscapes have a spatial form – 'a kind of archipelago – patchy, uneven, and not necessarily coherent' (Lepawsky, 2018, p. 15) – that sits uneasily with linear models of commodity chains and responsibility. Fashion brands use this patchy geography as they look to externalise this waste and to resist connection to, for example, families locked into debt-bonded labour in Cambodian brick kilns. Communications about where garment waste, including materialisations of their brand labelling, is travelling hence stay unanswered, as part of an apparent attempt to bound what parts of the production and discard networks are their concern.

More broadly then, this paper has argued that there is a conceptual imperative to understand the patchy form of commodity biographies. In her global tracking of the matsutake mushroom, Tsing deploys the notion of 'patch geographies' (Tsing, 2015, p. 225) to signal how the mushroom's biography is characterised by translations across spaces governed by very different cultural-economic logics. She argues that this patchiness has a wider resonance for our epoch, being characteristic of a capitalism disconnected from 'progress' and generating a prevalent 'precarity'. As she puts it: 'How might a capitalism look without assuming progress? It might look patchy' (Tsing, 2015, p. 5). Our argument has been that fashion's geographies are indeed composed of such patches and translations, and that the discardscapes of fashion offer a particularly powerful illustration of this. This patchiness goes beyond the divide identified by Crewe (2017) between glamorous spaces of fashion aesthetics, on the one hand, and less appealing and less visible spaces of garment production on the other. Crucially, it extends to fashion's implications in 'pericapitalist' (Tsing, 2015, p. 63) sites and forms of living such as the dump, with its pickers deploying entrepreneurial skills of survival, and the kiln, with its exploitative labour relations of debt bondage.

The forms of labour, living, and harm in 'patches' such as the brick kiln and the garbage dump are not determined by fashion or waste systems alone. They are forged through multiple 'material circuits' that take 'vivid form' and 'find common ground' in these sites (Chalfin, 2019, p. 504). This paper has foregrounded circuits of fashion textile waste. Deliberately backgrounded, but also apparent, have been circuits of finance and debt; of property speculation and construction; and of climate change, agricultural precarity and migrancy (Natarajan, Brickell et al., 2019). This overlaying of circuitry weakens senses of linear connection and responsibility – to put it crudely, of who or what is to blame or should act to improve matters. At the same time, though, it heightens the potential for impactful connections across circuits. In this paper, for example, we have tracked how waste discard practices result in garments' brand labels moving from factories directed at global export markets, through waste dumps and picker economies, to brick kilns, where through acts of play some got strewn on the ground and were photographed by Thomas around the feet of debt-bonded children. That photograph then circulates not only via this paper but in policy documents and other related communications (exhibitions, press releases, social media) framed by activist language (e.g., 'blood bricks', 'toxic fashion') designed to offer new brand associations (see Brickell et al., 2018). Here, then, the connective, relational logic of brands and logos (Lash & Lury, 2007), so central to fashion economies, takes on another role: associating the brick industry and its illegal forms of debt bondage, both little known outside Cambodia, with transnationally focused companies dedicated to aesthetic and reputational management. The health of brick kiln labourers is negatively impacted by the use of garment waste as fuel; however, their political visibility is potentially enhanced.

This leads us to a final reflection on the purpose of representing the patchy discardscapes of fashion. At the start of this paper we proposed that geographical work on commodity biographies should combine impulses to reveal, complicate and 'æffect'. Let us return to that suggestion. With regards to revelation, our research is indeed deliberately designed to make visible what otherwise might be neglected realities of life and labour, to tell stories that otherwise might not be heard, to audiences of policy makers and researchers within and beyond Cambodia. A key objective is wider recognition of the

forms of debt bondage, precarity and harm associated with the Cambodian brick industry, and its intersections with the garment industry. And yet, as noted above, our account also complicates simple adjudications of causation and responsibility. Our argument is not, for example, that international fashion brands are prime causes of, or primarily responsible for, spaces of harm such as brick kilns and waste dumps near Phnom Penh, though they are certainly implicated and involved in them through the discardscapes of preconsumer garment waste. Rather, running through our account is an æffective impulse to reorient attention across the patch geographies of fashion worlds. As Crewe (2017) has argued, aesthetic economies of fashion rest upon powerful processes of geographical association and dissociation. Some patches come to frame the worlding of fashion, others do not; æffective work can be conceived as an attempt to recompose that patch geography. Specifically, this paper has argued that the connections and translations between global fashion systems and discardscapes in the global south have been unduly neglected. More generally, our argument pushes for a broader framing for commodity biography, as a project that seeks both to document and reconfigure the translations between different, often globally distanced 'patches' of a commodity world.

## Notes

1. PM 2.5 is the concentration of microscopic particles less than 2.5 microns in diameter; PM 10 refers to the concentration of particles less than 10 microns in diameter.
2. More generally, Thomas's photography thus formed a vital component of the dissemination of research findings through public exhibitions and policy focused reports. See, for example, Brickell et al. (2018).
3. See <https://global.marksandspencer.com/plan-a/>.
4. From <http://www.wrap.org.uk/sites/files/wrap/Signatory-listing-June%2019.pdf>.
5. This unwanted association is reminiscent of how brands such as Primark were connected to the Rana Plaza garment factory collapse in 2013 through the presence of brand logos in the rubble. See I. Cook et al. (2018) and <https://www.pinterest.co.uk/followthethings/rana-plaza-labels-in-the-rubble/>.

## Acknowledgments

We would like to thank the funders of the brick-focused research underpinning the paper, namely the Economic and Social Research Council (ESRC) and Department for International Development (DFID) [ES/R00238X/1]. The garment dimensions of the paper were researched as part of UKRI Global Challenges Research Fund (GCRF) quality-related (QR) funding provided through Royal Holloway, University of London. To enable the time to support the writing of this paper, Katherine Brickell would like to express gratitude to The Leverhulme Trust for her Philip Leverhulme Prize [PLP-2016-127], and Laurie Parsons to the British Academy for his Postdoctoral Fellowship [ref: pf170152]. Access requests to underlying research materials should be addressed to [rdm@royalholloway.ac.uk](mailto:rdm@royalholloway.ac.uk).

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

This work was supported by the Economic and Social Research Council and Department for International Development [ES/R00238X/1] and the UKRI Global Challenges Research Fund (GCRF) quality-related (QR) funding provided to Royal Holloway University of London.

## References

- Asian Development Bank. (2014). *Cambodia: Diversifying Beyond garments and tourism, country diagnostic study*. ADB. <https://www.adb.org/sites/default/files/publication/149852/cambodia-diversifying-country-diagnostic-study.pdf>
- Bauman, Z. (2004). *Wasted lives: Modernity and its outcasts*. Polity Press.
- Binotto, C., & Payne, A. (2017). The poetics of waste: Contemporary fashion practice in the context of wastefulness. *Fashion Practice*, 9(1), 5–29. <https://doi.org/10.1080/17569370.2016.1226604>
- Brickell, K., Parsons, L., Natarajan, N., & Chann, S. (2018). *Blood bricks: Untold stories of modern slavery and climate change from Cambodia*. RHUL. <https://www.projectbloodbricks.org/publications>
- Brooks, A. (2013). Stretching global production networks: The international second-hand clothing trade. *Geoforum*, 44, 10–22. <https://doi.org/10.1016/j.geoforum.2012.06.004>
- Brooks, A. (2015). *Clothing poverty: The hidden World of fast fashion and second-hand clothes*. Zed Books.
- Bylander, M. (2015). Credit as coping: Rethinking microcredit in the Cambodian context. *Oxford Development Studies*, 43(4), 533–553. <https://doi.org/10.1080/13600818.2015.1064880>
- Chalfin, B. (2019). Waste work and the dialectics of precarity in urban Ghana: Durable bodies and disposable things. *Africa*, 89(3), 499–520. <https://doi.org/10.1017/S0001972019000494>
- Cook, I., et al. (2000). Social sculpture and connective aesthetics: Shelley Sacks's 'exchange values'. *Ecumene*, 7(3), 337–343. <https://doi.org/10.1177/096746080000700306>
- Cook, I., et al. (2004). Follow the thing: Papaya. *Antipode*, 36(4), 642–664. <https://doi.org/10.1111/j.1467-8330.2004.00441.x>
- Cook, I., et al. (2017). From 'follow the thing: Papaya' to followthethings.com. *Journal of Consumer Ethics*, 1(1), 22–29. [https://journal.ethicalconsumer.org/wp/wp-content/uploads/2017/04/JCE\\_2017\\_1\\_22\\_29\\_Cook.pdf](https://journal.ethicalconsumer.org/wp/wp-content/uploads/2017/04/JCE_2017_1_22_29_Cook.pdf)
- Cook, I., et al. (2018). Inviting construction: Primark, Rana Plaza and Political LEGO. *Transactions of the Institute of British Geographers*, 43(3), 477–495. <https://doi.org/10.1111/tran.12237>
- Cook, I., & Crang, P. (1996). The world on a plate. Culinary culture, displacement and geographical knowledges. *Journal of Material Culture*, 1(2), 131–153. <https://doi.org/10.1177/135918359600100201>
- Cooper, K.-L. (2018, July 31). Fast fashion: Inside the fight to end the silence on waste. *BBC News Website*. <https://www.bbc.co.uk/news/world-44968561>
- Crang, M. (2010). The death of great ships: Photography, politics and waste in the global imaginary. *Environment & Planning A*, 42(5), 1084–1102. <https://doi.org/10.1068/a42414>
- Crang, M., Hughes, A., Gregson, N., Norris, L., & Ahamed, F. U. (2013). Rethinking governance and value in commodity chains through global recycling networks. *Transactions of the Institute of British Geographers*, 38(1), 12–24. <https://doi.org/10.1111/j.1475-5661.2012.00515.x>
- Crang, P., & Ashmore, S. (2009). The transnational spaces of things: South Asian textiles in Britain and The Grammar of Ornament. *European Review of History*, 16(5), 655–678. <https://doi.org/10.1080/13507480903262660>
- Crewe, L. (2017). *The geographies of fashion: Consumption, space and value*. Bloomsbury.
- Duncombe, S. (2016). Does it work? The æffect of activist art. *Social Research*, 83(1), 115–134. <https://muse.jhu.edu/article/620873/pdf>
- EDGE. (2019). *Industry waste statistics*. EDGE. <https://edgexpo.com/fashion-industry-waste-statistics/>
- Ellen MacArthur Foundation. (2017). *A new textiles economy: Redesigning fashion's future*. Ellen MacArthur Foundation. <http://www.ellenmacarthurfoundation.org/publications>
- Fashion for Good. (n.d.). *About us*. Fashion for Good. <https://fashionforgood.com/about-us/>

- Food and Agriculture Organization of the United Nations & International Cotton Advisory Committee. (2013). *World apparel fibre consumption survey*. Economic and Social Development Department of the Food and Agriculture Organization of the United Nations and the International Cotton Advisory Committee. [https://www.icac.org/cotton\\_info/publications/statistics/world-apparel-survey/FAO-ICACSurvey-2013-Update-and-2011-Text.pdf](https://www.icac.org/cotton_info/publications/statistics/world-apparel-survey/FAO-ICACSurvey-2013-Update-and-2011-Text.pdf)
- Fredericks, R. (2018). *Garbage citizenship: Vital infrastructures of labor in Dakar, Senegal*. Duke University Press.
- Gidwani, V. (2013). Six theses on waste, value, and commons. *Social & Cultural Geography*, 14(7), 773–783. <https://doi.org/10.1080/14649365.2013.800222>
- Gidwani, V. (2015). The work of waste: Inside India's infra-economy. *Transactions of the Institute of British Geographers*, 40(4), 575–595. <https://doi.org/10.1111/tran.12094>
- Gould, H. (2015, February 26). Waste is so last season: Recycling clothes in the fashion industry. *The Guardian*. <https://www.theguardian.com/sustainable-business/sustainable-fashion-blog/2015/feb/26/waste-recycling-textiles-fashion-industry>
- Green, W. N. (2019). From rice fields to financial assets: Valuing land for microfinance in Cambodia. *Transactions of the Institute of British Geographers*, 44(4), 749–762. <https://doi.org/10.1111/tran.12310>
- Gregson, N., & Crewe, L. (2003). *Second-Hand Cultures*. Berg.
- Hartwick, E. (1998). Geographies of consumption: A commodity-chain approach. *Environment and Planning. D, Society & Space*, 16(4), 423–437. <https://doi.org/10.1068/d160423>
- Haug, A., & Busch, J. (2016). Towards an ethical fashion framework. *Fashion Theory*, 20(3), 317–339. <https://doi.org/10.1080/1362704X.2015.1082295>
- Institute, H. E. (2018). *The state of global air 2018: A special report*. Health Effects Institute. <https://www.stateofglobalair.org/sites/default/files/soga-2018-report.pdf>
- International Labor Organisation. (2016). *Cambodian garment and footwear sector bulletin issue 4*. ILO. [https://www.ilo.org/wcmsp5/groups/public/—asia/—ro-bangkok/documents/publication/wcms\\_517535.pdf](https://www.ilo.org/wcmsp5/groups/public/—asia/—ro-bangkok/documents/publication/wcms_517535.pdf)
- Isenhour, C., & Reno, J. (2019). On materiality and meaning: Ethnographic engagements with reuse, repair & care. *Worldwide Waste: Journal of Interdisciplinary Studies*, 2(1), 1–8. <http://doi.org/10.5334/wwwj.27>
- Joy, A., Sherry, J. F., Venkatesh, A., Wang, J., & Chan, R. (2012). Fast fashion, sustainability, and the ethical appeal of luxury brands. *Fashion Theory*, 16(3), 273–295. <https://doi.org/10.2752/175174112X13340749707123>
- Lash, S., & Lury, C. (2007). *Global culture industry: The mediation of things*. Polity Press.
- Lawreniuk, S. (2019). Intensifying political geographies of authoritarianism: Toward an anti-geopolitics of garment worker struggles in neoliberal Cambodia. *Annals of the Association of American Geographers*, 1–18. Advance online publication. <https://doi.org/10.1080/24694452.2019.1670040>
- Lepawsky, J. (2018). *Reassembling rubbish: Worlding electronic waste*. MIT Press.
- Lepawsky, J., & Billah, M. (2011). Making chains that (un)make things: Waste–value relations and the Bangladeshi rubbish electronics industry. *Geografiska Annaler. Series B, Human Geography*, 93(2), 121–139. <https://doi.org/10.1111/j.1468-0467.2011.00365.x>
- Lepawsky, J., & Mather, C. (2011). From beginnings and endings to boundaries and edges: Rethinking circulation and exchange through electronic waste. *Area*, 43(3), 242–249. <https://doi.org/10.1111/j.1475-4762.2011.01018.x>
- Li, T. M. (2010). To make life or let die? Rural dispossession and the protection of surplus populations. *Antipode*, 41(1), 66–93. <https://doi.org/10.1111/j.1467-8330.2009.00717.x>
- Millar, K. (2014). The precarious present: Wageless labor and disrupted life in Rio de Janeiro, Brazil. *Cultural Anthropology*, 29(1), 32–53. <https://doi.org/10.14506/ca29.1.04>
- Millar, K. (2018). *Reclaiming the discarded: Life and Labor on Rio's Garbage*. Duke University Press.
- Millington, N., & Lawhon, M. (2019). Geographies of waste: Conceptual vectors from the Global South. *Progress in Human Geography*, 43(6), 1044–1063. <https://doi.org/10.1177/0309132518799911>



- Mistra Future Fashion. (2019). *The outlook report 2011–2019. Mistra future fashion final program report*. RISE Research Institute of Sweden AB. [http://mistrafuturefashion.com/wp-content/uploads/2019/10/the-Outlook-Report\\_Mistra-Future-Fashion-Final-Program-Report\\_31-okt-2019.pdf](http://mistrafuturefashion.com/wp-content/uploads/2019/10/the-Outlook-Report_Mistra-Future-Fashion-Final-Program-Report_31-okt-2019.pdf)
- Nam, S. (2017). Phnom Penh's vertical turn. *City*, 21(5), 622–631. <https://doi.org/10.1080/13604813.2017.1375725>
- Natarajan, N., Brickell, K., & Parsons, L. (2019). Climate change adaptation and precarity across the rural–urban divide in Cambodia: Towards a 'climate precarity' approach. *Environment and Planning E*, 2(4), 899–921. <https://doi.org/10.1177/2514848619858155>
- Natarajan, N., Parsons, L., & Brickell, K. (2019). Debt-bonded brick kiln workers and their intent to return: Towards a labour geography of smallholder farming persistence in Cambodia. *Antipode*, 5(5), 1581–1599. <https://doi.org/10.1111/anti.12564>
- Norris, L. (2019). Waste, dirt and desire: Fashioning narratives of material regeneration. *The Sociological Review*, 67(4), 886–907. <https://doi.org/10.1177/0038026119854273>
- O'Hare, P. (2020). "We looked after people better when we were informal": The 'quasi-formalisation' of Montevideo's waste-pickers. *Bulletin of Latin American Research*, 39(1), 53–68. <https://doi.org/10.1111/blar.12957>
- Paling, W. (2012). Planning a future for Phnom Penh: Mega projects, aid dependence and disjointed governance. *Urban Studies*, 49(13), 2889–2912. <https://doi.org/10.1177/0042098012452457>
- Parsons, L., & Ly Vouch, L. (2020). *A survey of the Cambodian brick industry: Population, geography, practice*. Phnom Penh: Building Workers Trade Union of Cambodia.
- Payne, A. (2012). Nourishing or polluting: Redefining the role of waste in the fashion system. In E. Felton, O. Zelenko, & S. Vaughan (Eds.), *Design and Ethics: Reflections on Practice* (pp. 204–212). Routledge.
- Payne, A. (2019). Fashion futuring in the Anthropocene: Sustainable fashion as 'taming' and 'rewilding'. *Fashion Theory*, 23(1), 5–23. <https://doi.org/10.1080/1362704X.2017.1374097>
- Fashion Revolution (2015). *It's time for a fashion revolution (White Paper. December 2015)*. Fashion Revolution. [https://www.fashionrevolution.org/wp-content/uploads/2015/11/FashRev\\_Whitepaper\\_Dec2015\\_screen.pdf](https://www.fashionrevolution.org/wp-content/uploads/2015/11/FashRev_Whitepaper_Dec2015_screen.pdf)
- Rosaldo, M. (2019). The antinomies of successful mobilization: Colombian recyclers manoeuvre between dispossession and exploitation. *Development and Change*. Advance online publication. <https://doi.org/10.1111/dech.12536>
- Ross, A. (Ed.). (1997). *No sweat: Fashion, free trade, and the rights of garment workers*. Verso.
- Sekula, A. (1984). *Photography against the Grain: Essays and photoworks 1973–1983*. (B. Buchloh, Ed.). The Press of the Nova Scotia College of Art and Design.
- Shaw, W. S. (2019). Trashion treasure: A longitudinal view of the allure and re-functioning of discarded objects. *Environment and Planning. D, Society & Space*, 37(1), 122–141. <https://doi.org/10.1177/0263775818756643>
- Stanes, E., & Gibson, C. (2017). Materials that linger: An embodied geography of polyester clothes. *Geoforum*, 85(July), 27–36. <https://doi.org/10.1016/j.geoforum.2017.07.006>
- Szeman, I., & Whiteman, M. (2012). Oil imag(e)inaries: Critical realism and the oil sands. *Imaginations: Journal of Cross-Cultural Image Studies*, 3(2), 46–67. <https://journals.library.ualberta.ca/imaginatons/index.php/imaginatons/article/view/27246>
- Tsing, A. L. (2015). *The mushroom at the end of the World. On the possibility of life in capitalist ruins*. Princeton University Press.
- United States Environmental Protection Agency (EPA) (2019). *How does PM affect human health?* EPA. <https://www3.epa.gov/region1/airquality/pm-human-health.html>